

**ZAMBIA TRADE AND INVESTMENT ENHANCEMENT PROJECT  
(ZAMTIE)**

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**AGRICULTURAL BIOTECHNOLOGY AND BIOSAFETY IN ZAMBIA**

Prepared for

**ZAMBIA NATIONAL FARMERS UNION**

by

**Peter Gregory  
and  
Lovemore Simwanda**

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55 Independence Avenue  
PO Box 39398, Lusaka, Zambia  
Tel: (260-1) 251177/251127 Fax: 251141 E-mail:ronblack@coppernet.zm

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## **AGRICULTURAL BIOTECHNOLOGY AND BIOSAFETY IN ZAMBIA**

### **SUMMARY**

Genetically modified (GM) crops could boost Zambia's agricultural productivity and sustainability but, unless these products are managed effectively, their adoption could pose some risks to health and the environment and possibly have negative social and economic consequences. The Zambian government has drafted a biotechnology and biosafety policy that is designed to facilitate safe evaluation and commercialization of these products. Zambian National Farmers' Union (ZNFU) plans to provide feedback on the government's draft document and has been engaged in vigorous debate over the possible benefits and risks associated with adoption of GM crops and other genetically modified organisms (GMOs). The ZNFU-GMO Committee was constituted to facilitate discussion and formulate an organizational position on the subject. To assist the Committee, an international consultant and a national counterpart were hired under the auspices of the Zambia Trade and Investment Enhancement Project (ZAMTIE), a US Agency for International Development (USAID) project managed by Nathan Associates. The terms of reference for the consultants were to: (i) review the levels of understanding of ZNFU members on the application of GM crops in the agricultural sector and; (ii) consolidate the different members' views into a ZNFU consensus position that could provide a basis for input into government policy and legislation. This report summarizes the results of that assignment.

### **INTRODUCTION**

Currently, there is no research and development underway in Zambia on genetically modified (GM) crops or other genetically modified organisms (GMOs). Potential technology providers are awaiting the adoption of the government's biotechnology and biosafety policy and legislation before conducting in-country GM product evaluations. In the late 1990s there was an attempt to conduct field trials on Bt cotton. But these were abandoned after two growing seasons because the technology provider decided to suspend such work until a national regulatory system was in place.

The membership of the Zambian National Farmers Union (ZNFU) has been engaging in vigorous debate about the potential benefits and possible risks associated with the introduction of GM crops into the Zambian agricultural sector. While many members have expressed their certainty that adoption of GM crops would boost Zambia's agricultural productivity and sustainability, others have been equally convinced that the technology could pose risks to health and the environment, and possibly have negative social and economic consequences.

It was in this context that the ZNFU was mandated by the Annual Congress to form the ZNFU-GMO Committee. The Committee was constituted in such a way that different view points would be taken into account and is now the main reference group for ZNFU statements and positions on GMO issues.

At the first meeting of the ZNFU-GMO Committee in October, 2001 consensus was not reached on GM crop-related issues (see Appendix 1 for minutes of the meeting). Instead, it was resolved that such debate was premature and that the Committee should explore the levels of understanding of its members while studying biotechnology and biosafety policy from other countries in the region including the Southern African Development Community (SADC). To

avoid compromising any of the ZNFU members' interests or concerns it was decided that an independent international consultant should be hired and teamed up with a local counterpart. It was considered essential that the consultants should be unbiased and have neither a pro- or anti-biotechnology stance.

The terms of reference for the consultants were to: (i) review the levels of understanding of ZNFU members on the application of biotechnology (especially GM crops) in the agricultural sector and; (ii) consolidate the different members' views into a ZNFU consensus position that could provide a basis for input into government policy and legislation.

The consultants (who co-authored this report) were hired under the auspices of the Zambia Trade and Investment Enhancement Project (ZAMTIE), a US Agency for International Development (USAID) project managed by Nathan Associates, and started their two and a half week in-country study in late January, 2002.

First, they held a series of meetings in various parts of the country with representatives of ZNFU stakeholder groups in order to learn their views on the benefits and risks associated with adoption of GM crops in Zambia, to clarify issues, and to correct misunderstandings. The meetings involved personnel from government ministries, departments and research institutions, as well as from private companies, parastatals, non-governmental organizations (NGOs), district farmers' associations, and the ZNFU secretariat. The consultants also visited with local representatives of the Food and Agriculture Organization of the United Nations (FAO), the European Union (EU) and the US Agency for International Development (USAID). A list of organizations consulted is shown in Appendix 2.

The consultants then held, on February 12, 2002, a half-day workshop in Lusaka in which they presented to stakeholders' representatives and members of international development community a summary of the issues that had arisen during the previous separate meetings. Most of the workshop participants had been consulted during the preceding series of meetings. Valuable comments and suggestions were received from the participants on the accuracy and comprehensiveness of the consultants' findings.

After discussing and refining the issues in the workshop, the consultants developed a set of recommendations that could be used as a basis for a ZNFU position on biotechnology and in discussions between ZNFU and the Zambian Government as the latter develops its National Biotechnology and Biosafety Policy. These recommendations were presented to the Full Council of ZNFU in Lusaka on February 13, 2002 and were adopted unanimously.

The remainder of this report summarizes the issues that arose from discussions with ZNFU stakeholders during the study and the consultants' recommendations to the Full Council of ZNFU. The report also provides background information on global agricultural biotechnology and on the potential benefits and risks of GM crops in order to facilitate fact-based discussions between ZNFU and the Zambian government.

## BACKGROUND

### *Status of Agriculture in Zambia*

The performance of the Zambian agricultural sector is well below its potential across the three main agro-climatological zones of the country (the North (High rainfall, >1000mm), the Central (medium rainfall, 800-1000mm), and the South (Low rainfall <800mm)). Scanty rains characterized the start of the 2000/2001 growing season in most parts of the country. In some areas this led to delays in planting of crops, as well as replanting, due to insufficient moisture to promote germination. When the rainfall started it became so excessive that it resulted in flooding and widespread destruction especially along riverbanks. Although heavy rains continued in most parts of the country throughout the rainy season, poor rains and prolonged dry spells negatively affected crop production in the southern and eastern provinces. The country has huge water resources but many have not been developed.

Approximately 85% of the farmers in Zambia own less than one hectare of land and produce over 80% of the country's crops. All of Zambia's farmers have continued to suffer from the high production costs and depressed prices and the sector is strongly affected by high inflation, high interest rates, and exchange rate uncertainties. Weak consumer demand has also had an adverse impact on Zambian farmers, most of whom sell their produce mainly on the local market.

Finance costs are high in Zambia, and there is little medium-term finance available. There are far more lending institutions geared to agri- business in other Common Market for Eastern and Southern Africa (COMESA) and Southern African Development Community (SADC) countries where farmers are able to operate on short-term overdraft for seasonal requirements without paying high interest. They are also able to access hire purchase agreements for equipment, and as a result are able to maintain newer fleet of tractors and other farm equipment. The lack of this facility in Zambia means that, in general, tractors are older and therefore have higher maintenance costs.

Seed in Zambia is of inferior quality, and imported seed costs are high for most of the country's farmers.

The major agricultural commodities in Zambia, with notes on some of the factors affecting their production and marketing, are listed in Appendix 3.

### *The Global Context*

The total area cultivated with GM crops in the world currently stands at about 44.2 million hectares. This compares with 11 million hectares only three years ago.

At least twelve industrialized and four developing countries currently grow GM crops on a commercial scale.

In 2000, four countries grew 99% of the global GM crop area (Table 1). These were two industrialized countries, USA and Canada, and two developing countries, Argentina and China. South Africa ranks fifth and doubled the area planted to GM crops between 1999 and 2000.

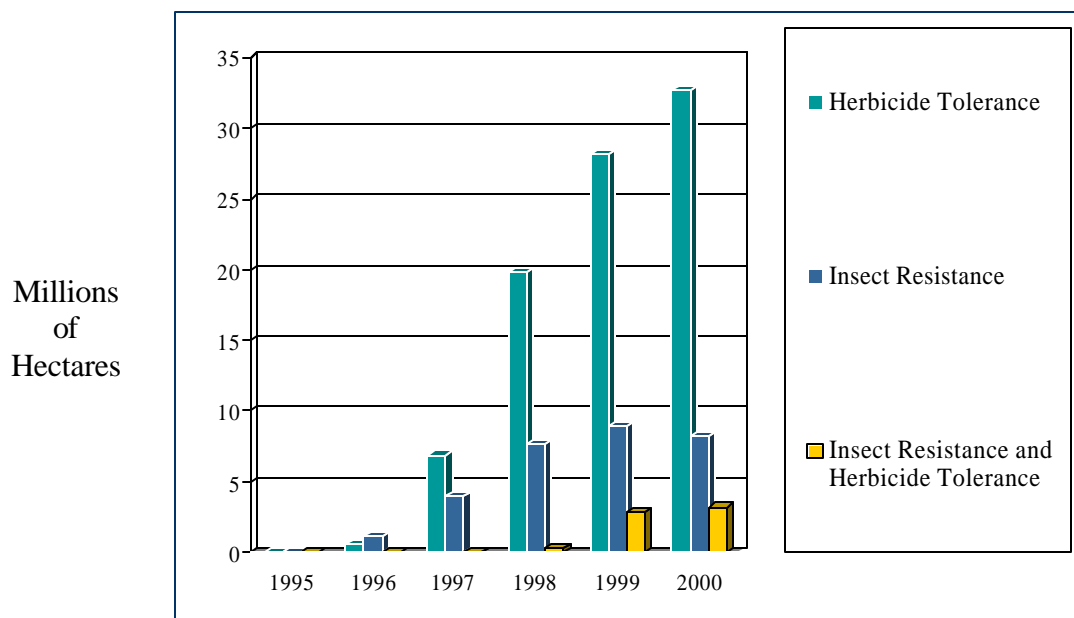
Table 1. Global Area of GM Crops in 2000 by Country

Country	Area (million hectares)	% Global GM Crop Area
USA	30.3	68
Argentina	10.0	23
Canada	3.0	7
China	0.5	1
South Africa	0.2	>1
Rest of the world	0.2	>1
Total	44.2	100

Source: ISAAA Briefs Nos 5; 8 Clive James, 2000

Currently, most of the commercial GM crops are either herbicide tolerant, insect resistant, or have a combination of herbicide tolerance and insect resistance (Fig 1).

Figure 1. Global Area of GM Crops by Trait



Source: ISAAA Briefs Nos 5; 8 Clive James, 2000

The insect resistant and herbicide tolerant traits have been incorporated mainly into soya, maize, cotton, and canola. With about 16% of the total area planted to these major crops being GM varieties, these products are already beginning to play an important role in increasing agricultural productivity and sustainability. There are also small areas of potato and papaya, with genes for

delayed ripening and virus-resistance inserted. Although several forest tree species, such as conifers, poplar, sweet gum and eucalypts, have been transformed using recombinant DNA technology, they have not so far been released for commercial purposes.

Although current releases are still very narrow in terms of crops and traits and the countries involved, several thousand GM crop field tests have been conducted or are underway, again mostly in industrialized countries. Some 200 crops are under field testing in developing countries, the vast majority of these in Latin America (152) followed by Africa (33) and Asia (19).

Many more crop-trait combinations are being investigated, with greater focus on virus resistance, quality, and, in some cases, tolerance to abiotic stresses. It can therefore be expected that the number of GM crops ready for commercial release in these countries will expand considerably in the next few years, although many important crops – such as pulses, vegetables, and fodder and industrial crops and certain traits – such as drought and aluminum tolerance – are still almost entirely neglected.

There are exciting prospects for developing an even wider range of crop/trait combinations because of the advent of genomics. This is a new, fast-moving science involving identification and isolation of genes with known functions followed by transfer to target varieties. It has the potential to strongly accelerate plant breeding for an enormous range of crop/trait combinations while boosting the conservation of biodiversity through improved use of plant germplasm collections. Currently, only a small fraction of the world's plant germplasm is being used for crop improvement, mainly because conventional plant breeding techniques are lengthy and expensive. It can take 10-15 years to develop a new variety using conventional approaches. For some crops, use of genomics could cut that time by at least 50%.

## **IMPLICATIONS FOR ZAMBIA OF ADOPTING GM CROPS**

Adoption of GM crops in Zambia could bring substantial benefits as well as some risks. Potential benefits could include a profound positive impact on farming and national food security with GM crops becoming a valuable tool to complement conventional and organic approaches. But there are also possible risks that are related to human and animal health, as well as social and economic considerations that need to be taken into account.

### ***Some Potential Benefits of GM Crops***

#### **More nutritious and less expensive foods**

GM crops could provide a broader array of more nutritious and safer foods for Zambia while lowering overall costs because of higher productivity and reduced losses throughout the marketing chain. Improved food quality of GM crops would result from added nutritional factors, reduced saturated fatty acids and increased unsaturated fatty acids, elimination of allergens in foods and introduction of factors that reduce the incidence of cancer.

Produce from GM crops is being developed that stays fresher, and is longer-lasting, because of improved shipping and storage quality. Healthier animal products will be result from higher quality feed.



### Higher and More Stable Rural Incomes

Rural incomes could be boosted and stabilized by adoption of GM crops. For it appears feasible to increase crop yield through this technology and to maintain such gains by introducing genetic tolerance to drought, flooding, heat, and cold. The same applies to GM crops with resistances to pests, diseases, and weeds that would also reduce input costs and the level of required crop management because of a lesser need for chemical controls.

Reduced post harvest losses, and enhanced marketability, because of better storability would also have a positive effect on rural incomes as would new markets for bioengineered products (e.g., plant-based replacements for petrochemical-based products, such as lubricants and plastics) that could be opened up through the use of GM crops.

### Less Environmental Damage even as Populations Grow

GM crops could increase productivity on existing fields and lead to reduced conversion of forest and marginal lands. The reduced use of agricultural chemicals mentioned above would reduce the risk of unintentional environmental pollution as well as reducing risks to human health.

Also, soil erosion would decrease as farming practices involving reduced tillage would be made more feasible through the use of herbicide-tolerant GM crops.

### Environmental Clean-Up

Research is underway to develop GM plants that can be used to absorb and store toxic and hazardous substances that might have polluted the environment through oil spills or chemical leaks. Also, GM plants act as biosensors to detect or monitor pollutants or other hazardous materials.

### Pharmaceuticals

GM plants are being developed that produce vaccines for the prevention of human and animal health problems such as colon cancer, diarrhea, and tooth decay. Thus, the delivery system is by direct consumption as food or feed with no purification or injections needed.

### **Some Possible Risks of GM Crops**

Crop biotechnology is one of the most extensively reviewed agricultural advancements to date. There have been no substantiated harmful effects of GM crops on human health or the environment.

Most commercial GM crops have been created in the U.S.A. and the EU and have been subjected to strict regulatory procedures. More than 1,700 field tests carried out at more than 6,500 sites in the U.S.A. alone.

There are, however, some possible risks associated with GM crop production, marketing, and use.

### Agro-ecological and Economic Risks

GM crops could adversely impact crop biodiversity if a small number of these products were to dominate the market place and the fields of small-scale subsistence farmers. Pest or disease outbreaks could result from such genetic uniformity (e.g., from a specific race of a pathogenic fungus evolving rapidly to overcome the defence mechanisms of a genetically uniform GM crop variety).

But, as mentioned earlier, the longer-term outlook for GM crops will involve increasing use of genomics that will result in greater use of the world's germplasm collections and therefore tend to increase conservation of biodiversity.

Pest resistant GM crops, such as those based on protection by Bt genes, could theoretically have negative effects on beneficial insects and other non-target organisms. This can, however, be avoided by effective measures that have been developed for the management and stewardship of such crops (e.g. the use of non-resistant refuges in the farmers' fields). Such measures can be costly to companies and governments.

Gene escape from fields of GM crops into their non-GM counterparts, or into related species, could lead to the development of resistant weeds, pests, or diseases. This could reduce production or force farmers to replace currently used products with potentially more harmful or more costly alternatives.

### Human Health Risks

As in the case of some conventionally bred crops, the use of GM crops could result in the introduction to food of substances that are useful to most consumers, but that might be allergens to some. There could also be long-term effects of extensively tested food substances that are intended to be toxic only to certain pests.

In addition, the unlikely possibility exists that there could be adverse consequences of residual antibiotic marker genes in food or that harmful organisms could develop as a result of gene exchange between GM crops and wild organisms.

### Marketing and Agricultural Choice Risks

There could be loss of markets, such as the EU, that ban or avoid GM crops. In addition, there could be reduced efforts to seek alternative solutions if GM crops are overemphasized accompanied by reduced competition in input supply resulting in fewer choices or higher prices for farmers.

### Legal and Political Risks

Disputes could arise over intellectual property issues, including patenting of life, especially where the national interests differ from those of multinational suppliers. There could also be disputes over accountability and liability regarding food safety and biosafety concerns because of the lack of clear and broadly accepted internationally accepted technical standards.

### ***A Note on Animal Biotechnology***

Although the focus of this assignment is on GM crops, it is worthwhile to mention that advances in animal biotechnology could likely have wide-ranging, positive impact in Zambia once an enabling framework for biotechnology and biosafety is put in place. Examples include:

- Bioengineering animals to produce human medical treatments for disorders or diseases, e.g. fibrinogen from sheep (blood clotting/wound treatments);
- Facilitating organ and tissue transplantation from animals to humans, e.g. modifying pigs to suppress a rejection protein;
- Spider silk production from modified goats to make ultra-strong material for bullet proof vests, sutures etc;
- Production of medical compounds such as monoclonal antibodies, hormones, and blood proteins;
- Modifying fish to enhance growth, develop disease resistance (in aquaculture); and
- Modifying insects to improve effectiveness of insect predators of pests, reduce virulence of insect pests, or eliminate insect-mediated transmission of human diseases (e.g. malaria) and livestock diseases.

### **ISSUES ARISING FROM DISCUSSIONS WITH ZNFU STAKEHOLDER REPRESENTATIVES**

During the consultations with ZNFU members eight primary issues arose:

1. All members believe that there is inadequate awareness of the potential benefits and risks associated with GM crops;
2. Almost all members support governmental efforts to finalize and implement a biotechnology and biosafety policy and a regulatory framework. Regulations must be in place to address unintended introduction of GM crops to Zambia. No GM crop trials should be conducted before regulations are implemented and there should be no pre-trials commercialization of GM crops. Extensive assessment of risks and benefits should be conducted before initiating commercial production of GM crops. It should be noted, however, that it could take up to 5 years to develop locally adapted products and evaluate them;
3. All members agree that there is a lack of qualified government personnel to implement and monitor the GM crop trials or commercial production. Continuation of needs assessment for national capacity should be given high priority. International development funding could be sought to help build national capacity;
4. Most members agree that selected GM crops should be identified for pilot experiments and for benefit/risk analyses after the regulations are put in place. Several pilot GM crops were suggested. Non-export trade products may be economically safest, as emphasized by small-scale farmers and several other members. International development funds might be obtained to support the pilot initiatives. Multinationals and public sector institutions might donate GM technology for local adaptation and testing;
5. Most members agree that experiments on GM crops should be conducted in remote locations to avoid the spread of novel traits to conventional crops. Some members, however, suggested that the work be conducted on experiment stations where trained personnel are more likely to be available;

6. Some members fear that farmers might become over-dependent on a few multinational companies for GM seed or GM seed-herbicide combinations. This is unlikely to significantly impact Zambian agriculture for the next 10 years because of anticipated slow growth rate of the local GM crops industry. The danger would lessen over the long-term as the number of products and involved companies will increase;
7. Most members believe that biodiversity could be threatened by GM crops. But these members were receptive to the idea that GM crops can also increase biodiversity by using genomics to increase the use of crop germplasm collections and by making possible the re-emergence of wildlife (e.g. in the Bt cotton fields of the Makhathini Flats);
8. Several members believe that European market access for all Zambian export crops could be negatively affected if any GM crops were to be grown here. No product is banned from the European market because there is a GM version of the crop in the exporting country. Discussion is underway in the EU to give countries that are GM-free for a specific crop a special position; the crop would not have to be screened for GM presence. Good registration of the GM products would be needed to ease discussions on traceability.

## RECOMMENDATIONS

Based on the issues above the following actions were recommended to ZNFU:

1. Continue an awareness campaign to inform all stakeholders on the benefits and risks of GM crops and thus provide an improved basis for decision-making. Seek funding from the international development community to support this effort;
2. Strongly support governmental efforts to develop and implement a strong biotechnology and biosafety policy and regulatory framework. Request opportunities to review and comment upon draft documents;
3. Emphasize to government the urgent need for increased national biotechnology capacity if new regulations are to be implemented effectively. Initiate, and collaborate on, efforts to attract funding from international development agencies;
4. Work with government and other stakeholders to carefully decide on which pilot GM crops should be evaluated for benefits and risks under the new regulations. Take into account the necessity of adopting a GM approach versus conventional or organic approaches to solve a particular agricultural constraint and the level of risk to international trade;
5. For each pilot GM crop selected carefully evaluate the relative merits of conducting trials in remote areas versus experimental stations

## RESULT

The ZAMTIE recommendations were unanimously accepted and adopted at the February, 2002 ZNFU Council Meeting.

## SUGGESTED READING

Betz, F. S.; Hammond, B. G.; Fuchs, R. L. (2000). Safety and advantages of *Bacillus thuringiensis* (Bt)-protected plants to control insect pests. *Regulatory Toxicology and Pharmacology*, 32, 156–173.

Burges, H. D. (2001). *Bacillus thuringiensis* in pest control: Now and the future. *Pesticide Outlook*, 12(3), 90.

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James, C. 2001. Global status of commercialized transgenic crops: 2000. ISAAA Briefs No. 23, ISAAA, Ithaca, NY.

NRC (2000). Genetically Modified Pest Protected Plants: Science and Regulation. National Academy Press. 261 pp.

Pew Initiative on Food and Biotechnology. 2001. Harvest on the horizon: Future uses of agricultural biotechnology. Pew Initiative on Food and Biotechnology website at <http://pewagbiotech.org/research/harvest/harvest.pdf>

Thompson, J. (2000). Developing countries can't wait and see. Center for International Development at Harvard University website at <http://www.cid.harvard.edu/cidbiotech/comments/comments69.htm>)

Wambugu, F.M.; 2001. Modifying Africa: How biotechnology can benefit the poor and hungry. A case study from Kenya. See website at <http://www.modifyafrica.com>

## **APPENDICES**

### **Appendix 1. Minutes of the First ZNFU GMO Committee Meeting Held on October 23, 2001 at 10:00 Hours at the ZNFU Head Office**

#### **PRESENT**

Mr. P. Cartwright	-	ZNFU Director in the Chair
Mr.S. Fleming	-	Oilseeds
Mr. J. Downie	-	TAZ
Mr. A. Musamba	-	ZNFU Director – Small-scale farmers
Mr. L. Mbewe	-	ZEGA
Mr. S. Zyambo	-	ZNFU Executive Director
Mr. L. Simwanda	-	ECAZ
Mr. R. Mase	-	BCPAZ
Bro. P. Desmarais	-	Kasisi Argicultural Training Center
Mr. J. Clayton	-	ZNFU Director – Fruits and Vegetables Chairman
des Vos	-	OPPAZ/ACOA

#### **Apologies**

Mr. A. Vashee	-	ZNFU President
Mr. D. Gordon	-	Sable Farms

#### **1.0 Introductory Remarks**

The Chairman welcomed all to the meeting and stated that he was chairing on behalf of Mr. Vashee. He briefed the meeting about the background of the formation of the committee and its intended role in the GMO debate and legislation. The constituted committee will be the main reference group for ZNFU statements and stand on GMO issues. A special mention was made of a GMO meeting held under the auspices of the Agricultural Consultative Forum (ACF) and since most of the invited members had attended, they were requested to brief the meeting on their perception of the meeting.

#### **2.0 Background of the GMO Committee**

The ZNFU Executive Director briefed the meeting about the background the Committee. The ZNFU has diverse members and some are supportive of the issue while others are against. It is from this point of view that the ZNFU was mandated by the Annual Congress to form a ZNFU committee. As a first step, the ZNFU approached the Government technocrats who are spearheading the GMO legislation. A tentative programme to consult ZNFU farmers was planned but unfortunately, it never took place. The Government technocrats have expressed willingness to work together with the GMO committee. The committee was put together deliberately to represent various viewpoints of the ZNFU membership.

### **3.0 Comments on ACF GMO Workshop**

The various members who attended the workshop reported as follows;

- The workshop was supportive of putting in place GMO legislation.
- The National Institute for Scientific Research is spearheading the GMO legislation debate.
- The workshop recognized the need to recognize the diverse viewpoints in the GMO debate.

#### **Resolved**

- The meeting resolved that the deliberations of the meeting at ACF be circulated to members as soon as they have been sent to the ZNFU secretariat. The way forward in the ACF meeting should be fitted into the ZNFU committee way forward and resolutions.

### **4.0 Open Discussion**

The meeting was allowed to debate the way forward before a consensus was reached. Some viewpoints of those present are summarized below:

- It is premature to debate the pros and cons of the GMO issue. Instead the committee should explore the legislative option by studying versions that are in countries that have it. In addition, the SADC protocol on biosafety must be utilized to frame Zambia's legislation.
- Legislation from other countries must be circulated to members to study.
- There is need to put on board issues of market access and economics in the process of studying other legislation and formulating our own.
- There is need to educate small-scale farmers and involve them in every stage of the consultations. The Zambian Farmer magazine should be used as a possible tool.
- Any further stakeholders' consultations must stop since they are not well structured and are therefore not yielding the expected results since the stakeholders have little knowledge about the issue. The debate needs to be guided through a structure such as the ZNFU committee, which should eventually transform itself into a representative pressure group.
- Need to consider hiring a consultant to review all existing legislation and present to the Committee and later to the ACF.
- There is need to reach consensus on the farmer's side by accepting the offers that USAID and FAO have made to ZNFU to support such consultations and consultancies. However, the meeting felt that the assistance must be balanced by involving balanced perceptions from the donors.

#### **Action areas**

1. Appoint persons within the committee to sit on the Government National Committee. The persons appointed would be providing input to the national committee based on resolutions reached by the ZNFU Committee.
2. The resolutions of the ACF meeting must be circulated to members.
3. The European Union must be approached to jointly carry out farmer consultations and consultancy for review of legislation. The aim is to provide a balanced approach considering that EU is anti, while USAID is pro and FAO is neutral.

4. Develop Terms of Reference for the consultants who will review existing legislation.
5. Agri South Africa (equivalent to ZNFU) and SACAU (umbrella body for farmers' associations in Southern Africa) will be contacted on the process individual countries went through to develop legislation.
6. The Government must be informed about the resolutions of the ZNFU committee and the various actions it is undertaking. The Government must be requested to recognize the committee and that it will work within the framework of the national committee.
7. Messrs. L. Simwanda and S. Zyambo will spearhead the process of external consultations.
8. The persons to interface with the national committee were appointed as follows; Mr. J. Clayton, Mr. L. Simwanda and an OPPAZ representative.

## **5.0 ZNFU Resolution and way forward**

1. The ZNFU supports all efforts to develop and put in place a GMO legislation that protects those who support or oppose GMOs.
2. As the process of legislation is being pursued, the ZNFU seeks a moratorium to be put in place regarding GMO use in Zambia.

## **6.0 Any Other Business**

- Some members requested that they be advised on sources of GMO information on the Internet. In this regard, Mr. Simwanda circulated a background paper that would provide an independent but informative viewpoint on the issue of GMOs.
- The meeting resolved that the Grains Commodity Committee Chairman or Mr. D. Gordon must be put of the committee.
- Members of the committee should appoint alternates who should attend meetings in case they can not make it. These names must be communicated to the secretariat.
- The meeting resolved that e-mail communication would be the main mode for the committee.

## **Next Meeting**

The next meeting was tentatively scheduled for 6<sup>th</sup> November 2001 at 10:00 hours but subject to various action assignments being accomplished by the secretariat.

## **Circulation**

Members, Board members, Executive Director



**Appendix 2. ZNFU Membership Groups and National and International Organizations Consulted.**

1. Ministry of Science, Technology and Vocational Training
2. Ministry of Agriculture, Food and Fisheries
3. Ministry of Tourism, Environment and Natural Resources
4. National Biosafety Focal Point at the National Institute for Industrial Research
5. Organic Producers and Processors Association
6. Zambian Export Growers Association
7. ZEGA Training Trust
8. Vector Tobacco
9. Programme Against Malnutrition
10. Agriculture Consultative Forum
11. Legal affairs officials
12. Ministry of Finance
13. PANOS
14. Cotton Development Trust
15. Zambia Agro-chemicals Association
16. Environmental Council Of Zambia
17. Zambia Sugar Company Management of Mazabuka
18. Mazabuka Farmers Association
19. Environmental Conservation Association of Zambia
20. ZNFU Board members
21. ZNFU small-scale farmers representatives
22. Dunavant Cotton
23. Phyto-sanitary unit of Mt. Makulu Research Station

24. Tobacco Association of Zambia
25. ZNFU-GMO Committee
26. Chisamba farmers association
27. Kabwe farmers association
28. AGCHEM Technical Services
29. Coffee Growers Association
30. Clark Cotton
31. Kasisi Agriculture Training Centre
32. Serenje farmers association (small-scale representation)
33. World Bank
34. FAO
35. Swedish International Development Agency
36. USAID
37. The Cooperative League of the USA (CLUSA)- Lusaka and Chipata projects
38. Zambia Agribusiness Technical Assistance Center
39. United Nations Development Programme
40. United States Embassy
41. EU
42. Netherlands Embassy
43. Norwegian Overseas AIDS Development (NORAD) and the ZNFU/NORAD Project
44. Export Board of Zambia

### **Appendix 3. Major Agricultural Commodities in Zambia**

#### **Maize**

The deficit in maize for the year 2001 has resulted in high prices and has led to a sharp increase in the price of maize meal, which is trading above K 25,000 per 25 Kg bag of white maize mealie meal. Maize production for the 2000/2001 season was 801,889 metric tons. This represents a reduction of 38.8 percent from the 1999/2000 production. Depending on the region, this decrease can be attributed to flooding water logging or drought conditions. The national reduction in maize production this year is mainly due to the decrease in production in Southern and Eastern Provinces.

#### **Wheat**

As in the case of maize farmers, Zambian wheat farmers have been badly hit by the high cost of production. The number of individual wheat farmers has fallen by over 70% in the last three years. Millers continue to prefer cheaper wheat from abroad because imported grains are cheaper as a result of lower production costs this is particularly evident in Zimbabwe. Demand for wheat is 150,000 MT per year but production has remained around 55,000 to 70,000 tons. Wheat is a crop predominantly grown by commercial farmers from an area of around 10,000 hectares annually.

#### **Soya**

Low prices of soybeans continue to frustrate the farmers who have to compete with the prices offered by other countries in the region. Zambia soybeans also have to compete with the price of soybeans from South America. The most viable markets are inland processors. Still, soybeans offer potential for regional trade with South Africa and Botswana, which require more than 150,000 MT of imported soybean annually. The accessibility of these markets, however, is determined by international prices, particularly within Zimbabwe, which is closer to these export destinations and thus enjoys lower transportation costs. The Zambia domestic requirement for edible oil is around 20,000 MT per annum. The soybean crop requirement to meet the oil requirement is between 140,000 and 150,000 MT whereas the current annual domestic production is under 50,000 MT.

Several important factors related to soybean production in Zambia are:

- The naturally nodulating “Hernon 147” has been introduced alongside the local ‘Kaleya and Magoye’ varieties, which were introduced in the 1980s. Hernon 147 removed the requirement for keeping rhizobial inoculums at temperatures below 5 degrees Celsius until sowing, which has been generally beyond the capacity of small-scale farmers.
- Recently a liquid inoculum from South Africa has become available which does not require cool storage and can tolerate temperatures of up to 40 degrees Celsius. This has led to the introduction of other varieties such as Solitaire, Soprono and Somo. With this development, small-scale production peaked in the early 1990s, but has since been on the decline due to low market prices and the elimination of input support previously provided by the local company, LINTCO.

- Zambia domestic markets for soybeans are largely driven by the livestock industry's demand for cake. Soybean demand results from the use of the crop as a high protein cake for stock feed, a high energy feed for livestock, a source of protein in corn-soya blends, a meat extender, and as a direct human food. Generally the trend of soybean production is dependent on the performance of the livestock sector.
- Importation of refined oil has put local refiners under pressure.

## **Sunflower**

Sunflower is predominately a small-scale farmer crop, unlike soybeans, with commercial farmers accounting for less than 1 % of total production. Long-term prospects for the sunflower industry are good. The crop will produce some reasonable yields even under the harshest conditions and is noted for its drought resistant characteristics during vegetative growth. Despite these advantages, sunflower yields remain low, with most small farmers achieving less than half a ton per hectare. The potential for improved yields is considerable.

## **Cotton**

Until recently, the cotton sector experienced rapid growth with total export value having increased by more than 200 % compared with the period before economic liberalization. Typical export values for all cotton products including ginned cotton, cotton seed, yarn and cloth have been around US\$ 60 million per year in recent seasons--equivalent to about 20 % of Zambia's non-traditional exports earnings in 1999. In the last ten years cotton production increased from approximately 30,000 MT of un-ginned seed cotton in 1990 to a peak production of over 104,500 tons in 1998. During the same period, the number of small-scale growers also increased dramatically to peak at an estimated 86,000 farmers in 1998. The total area planted to cotton has ranged from just 35,200 in the 1995-96 season to 105,623 hectares in 1999-2000. Of this total, the majority is planted by small-scale farmers under dryland conditions on plots rarely exceeding two hectares. The expected cotton production is 100,000 MT for the current season. This is four times the consumption level for Zambia. Cottonseed cake is not yet popular. Currently, only one company, Superoil Company of Lusaka, can process cottonseed. Most cotton is supplied to ginning companies, which are currently operating at 40 % capacity.

## **Export Horticulture**

Floriculture is a sector that has focused most of its production on export markets. A considerable number of commercial growers have taken up floriculture, with special emphasis on roses. Expansion of the rose industry was attributed to a revolving fund facility for procurement of inputs and small capital items and some marketing assistance. This donor provided facility has expired and this poses a danger to expansion of the sector.

Fruits and vegetable production has also been a rapidly expanding sub-sector. Earnings reached US\$ 28 million in 1999 *versus* US\$ 20 million in 1998. Increasing the investment in agro-processing could further enhance the demand for fruit and vegetable produce. Currently, the cost of processing is high due to lack of modernized plants. Other areas that need improvement are

crop quality, storability, marketing, and cooperation among farmers in the areas of transportation and marketing.

### **Tobacco**

In 1992, the tobacco sub-sector was severely affected by a drought that left many farmers unable to pay back loans. Generally, the Zambian climate is well suited to the production of flue-cured Virginia tobacco and air-cured burley tobacco. The annual export value has been in excess of US\$ 11 million recently despite a period of low world prices. About 6,000 hectares of burley and 1,900 hectares of flue-cured Virginia have been cultivated in recent years with a total output of 6.4 million and 2.1 million Kg respectively. Farmers would benefit from drought tolerant varieties.

### **Coffee**

The coffee sub-sector has grown significantly since 1990. The number of commercial growers has risen from 20 in 1990 to 70 in 2000. During the same period the area planted grew from 1,000 to 3,800 hectares, while output increased from 1,300 MT to 4,300 MT. Smallholders have also increased in number from 600 to 900 during the same period. Most plantings on independent commercial farms started around 1984 with continued expansion throughout the 1990s as world coffee prices reached all-time record highs and finance became available through the World Bank's Coffee I and II loan facilities and also from the Enterprise Development Fund. More recently coffee prices have fallen to a 30-year low but are forecast to gradually recover. Even at lower prices, coffee is a profitable crop in Zambia.

The promotion of foreign investment in coffee could expand the huge potential already existing in the sub-sector. Inadequate local long-term financing however continues to be a constraint to the expansion of the industry.

### **Paprika**

Paprika although more complicated to grow than cotton, can provide nearly three times as much net return from an equivalent sized plot. A return of K 355,000 (US\$ 96) per quarter-hectare may be obtained and, therefore, paprika is likely to be a good crop choice, especially for households with a shortage of active labor, including female headed households. The paprika sector has experienced tremendous growth in recent years expanding from a small base of only 150 MT total production in 1995 to more than 3,000 MT expected in the 2001/2002 season, including some 700 MT grown as a rain fed crop by small holder farmers and the balance produced mostly on irrigated commercial farms. Production of paprika for export has also been increasing, mainly due to good prices offered by private companies running outgrower schemes. However, export revenues for paprika fell from US\$ 2.8 million in 1999 to US\$ 1.8 in 2000. This was mainly attributed to inclement growing conditions rather than a major structural transformation of the sector.

## **Pigs**

There has been a shortage of pigs due to poor producer prices. It is a sub-sector in which producers and processors need to develop increased collaboration. The industry is also battling with cheap imports of processed meat and reports of even cheaper mechanically de-boned meat.

The shortage of live pigs (partly caused by stringent importation procedures) has forced some local processors to start offering improved prices. This is leading to some recovery in the pork production industry and the outlook is much improved.

## **Beef**

The livestock sub-sector's contribution to agricultural gross domestic product has been decreasing since 1996. This is attributed partly to disease outbreaks, particularly foot and mouth disease, contagious bovine pleuro pneumonia and east coast fever which killed a significant proportion of livestock. The sub-sector, however, has seen some growth in the number of feed lots and abattoirs.

The major issue in the sub-sector is to maintain and increase the animal population using a sustainable disease control program.

## **Dairy**

Less than 50 commercial farmers dominate the Zambian dairy industry, accounting for about 60,000 litres of milk production per day. The dairy sub-sector has faced a number of problems. For example, Zambian farmers have difficulty in contending with imported with imported cheap subsidized powdered milk from New Zealand. Nevertheless, privatisation has led to more than an 8-fold increase in the number of processing plants. This has led to a need to increase the milk production by both small and large-scale farmers. The Democratic Republic of Congo, with its close proximity, is the most promising export market. However, Zambia is a net importer of milk. Marketing strategies therefore would need to take this into account.

## **Poultry**

The poultry and feed industries have grown significantly in terms of the number of hatcheries and feed processing plants. Growth of the poultry industry has been catalyzed by the prevailing ban on poultry imports due to disease in both SADC and COMESA countries. The current issue in this sub-sector is keeping the cost of feed low and having consistent quality from local feed companies.

## **Appendix 4. Comments on Zambia's Draft National Biotechnology and Biosafety Policy**

### **General comments**

Zambia should be applauded on their maiden attempt to address biotechnology and biosafety issues. The draft National Biotechnology and Biosafety is a major step in the right direction but the document needs to be given additional serious thought before it can become a policy *per se*.

For example, by using the precautionary principle as a guide, there is the risk of creating impractical and scientifically unreasonable standards that might hinder technology transfer and technology development in Zambia.

The consultants would have serious concerns if the interpretation of such a wide-ranging principle would move away from a rational, factual, proportionate and science-based foundation. We strongly recommend that the practical issues associated with use of the Precautionary Principle are addressed as soon as possible.

Also, there needs to be urgent attention given to issues of regional and global harmonization and how biosafety training in particular, and capacity building in general, are to be put into high gear.

### **Suggested revisions**

Please see the suggested changes in the text of Zambia's Draft National Biotechnology and Biosafety Policy document accompanying this report.

**JANUARY 2002 DRAFT NATIONAL BIOTECHNOLOGY AND  
BIOSAFETY POLICY with ZAMTIE Recommendations in Italics**



## **ABBREVIATIONS AND ACRONYMS**

BAC	Biosafety Advisory Committee (s)
CBD	Convention on Biological Diversity
CDT	Cotton Development Trust
COP	Conference of Parties
CVRI	Central Veterinary Research Institute
DST	Department of Science and Technology
GEF	Global Environmental Facility
GMO	Genetically Modified Organism
IBC	Institutional Biosafety Committee
NAIC	National Artificial Insemination Centre
NBA	National Biosafety Authority
NBSAP	National Biodiversity Strategy and Action Plan
NISIR	National Institute for Scientific and Industrial Research
NMCC	National Malaria Control Centre
SCCI	Seed Control and Certification Institute
SCRB	Soils and Crops Research Branch
SPS	Sanitary and Phytosanitary Measures
UNCED	United Nations Conference on the Environment and Development
UNEP	United Nations Environmental Programme
UNZA	University of Zambia
UTH	University Teaching Hospital
WTO	World Trade Organisation

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## 1. **INTRODUCTION**

Biotechnology is any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use. There is a universal recognition and realisation that biotechnology can contribute significantly to the social and economic development of developing countries such as Zambia. This is particularly so in the areas of agriculture, health care, environment as well as industry. However, maximal benefits from biotechnology can only be derived if it is applied ***judiciously in the context of sustainable development***. The safe research, development, application and commercialisation of biotechnology, which has come to be known as Biosafety, has generated a lot of interest and attention world-wide, especially following the United Nations Conference on the Environment and Development (UNCED) which took place in Rio de Janeiro, Brazil in 1992, resulting in Agenda 21.

Chapter 16 of Agenda 21, "Environmentally Sound Management of Biotechnology", is devoted to Biosafety. The term biosafety describes a set of measures used to assess and manage any risks associated with processes and products of biotechnology. Such risks may transcend or be inherent in the technology itself and need to be managed accordingly. Biosafety also features prominently in the Convention on Biological Diversity (CBD) through the sustainable use of biotechnology. The CBD has gone further by developing a Protocol on Biosafety that has been adopted by the Conference of the Parties. The United Nations Environment Programme (UNEP) went a step further, and

developed the UNEP International Technical Guidelines for Safety in Biotechnology.

## **2. BACKGROUND**

***As in the case of any living organisms***, the introduction of Genetically Modified Organisms (GMOs) into the environment ***may pose certain risks***. GMOs are organisms or cells whose genetic material has been deliberately altered to make them capable of producing new substances or perform new functions.

***Genetic material of plants, animals, microbes or other sources contains functional units of heredity that may be transferred from one organism to another, within or across species.***

Introduction of new organisms into the environment ***may result*** in harm to the environment. Similarly, handling of pathogenic or non-pathogenic microorganisms or their fragments can be dangerous. The chemicals that are used in these manipulations can also be highly harmful to life. Thus, although biotechnology has demonstrated its utility, there are concerns about potential risks to biodiversity, human and animal health and the environment.

Biosafety issues in human and animal medical biotechnology ***include*** the consideration of possible toxic or allergenic effects arising from introduced gene product(s) and production of new strains that are more virulent and resistant to drugs. Environmental considerations involve the potential for uncontrolled spread of the modified organisms and/or the introduced gene. Issues such as

the existence of other hosts in the area, and the potential for gene spread to such unintended hosts are also of importance.

The CBD negotiated under UNEP's auspices, was adopted on 22<sup>nd</sup> May 1992, and entered into force on 29<sup>th</sup> December 1993. Article 8 (g) of the CBD states that: "Each Contracting Party shall, as far as possible and as appropriate: Establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from modern biotechnology, which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking into account the risks to human health".

Similarly, there are a number of instruments and agreements at regional and international levels that directly or indirectly address the issue of Biosafety. Among these are;

- The United Nations Food and Agriculture Organisation Code of Conduct on Plant Biotechnology
- The Office of International Des Epizooties
- United Nations Industrial Organisation Voluntary Code of Conduct for the Release of Organisms into the Environment
- Codex Alimentarius
- The World Trade Organisation (WTO) Agreement on Sanitary and Phytosanitary Measures (SPS).

These instruments however, have a limited scope **and** do not **comprehensively address international** movements and handling of living modified organisms. Also, most of the existing international instruments are voluntary and are not legally binding since they are just guidelines.

The Government of the Republic of Zambia has signed and ratified both Agenda 21 and the CBD and in 1997 developed the National Biodiversity Strategy and Action Plan (NBSAP). This NBSAP was adopted by the Zambian Government in 2001. In addition, Zambia has participated fully in the meeting of the Open-ended *Ad Hoc* Working Group of Experts on Biosafety, which has developed a Protocol on Biosafety under the auspices of the CBD. Zambia, also, actively participated in the development of the UNEP International Technical Guidelines for Safety in Biotechnology.

The rate of development and level of success of Biotechnology, as with any new technology, are dependent not only on the scientific and technological capacities of a country, but also on a supporting infrastructure and accepting environment in which it is to be introduced and used. As concerns about safety in biotechnology and its products are being raised worldwide, a key component in the establishment of a "biotechnology accepting" environment is the formulation of a biosafety regulatory framework, creating a national biosafety authority **and ensuring that** the required infrastructure **is in place and functioning adequately**. The cornerstones of the biosafety regulatory framework **are** biosafety regulations and guidelines **and having trained individuals with authority to act in the interests of public health and environmental safety**.

Biosafety regulations and guidelines in themselves cannot ensure the safe research, development, application and commercialisation of biotechnology. Equally important, however, is acquiring the capacity to implement regulations and guidelines via environmental impact assessment and risk management, taking into consideration socio-economic factors. Biosafety guidelines and regulations must be developed with a clear understanding that their implementation depends on the availability of human resources (in terms of quantity and quality), financial resources, as well as institutional and infrastructural capacities at national, regional and global levels.

It is possible under the current scenario in Zambia to ensure that biotechnology research, development, application and commercialisation is carried out with minimum adverse effects both to human health and the environment. In the absence of biosafety regulations and guidelines, some laws in the Zambian statutes can be used to ensure minimum risks to human health and environment from biotechnology. These laws basically deal with the transfer, handling, release and use of animals and plants. The other laws are concerned with protecting the general public and the environment from possible effects of industrial activities. There are, however, no laws, which deal specifically with the transfer, handling and use of microorganisms.

The non-existence of legislation on GMOs poses risks as Zambia could be attractive to foreign biotechnology companies or institutions wishing to test products that cannot be tested in tougher regulatory climates of their countries. Furthermore, with the liberalised economy, Zambia has become a promising market of pharmaceuticals and agro products some of which may be products of gene manipulation.

### **3      *MISSION STATEMENT***

The mission of the biotechnology and biosafety policy is to guide the judicious use and regulation of modern biotechnology for sustainable development of the nation, with minimum risks to human and animal health as well as the environment, including Zambia's biological diversity.

### **4      *OBJECTIVES***

- 4.1 To support the development of research and industrial capacity to safely apply biotechnology techniques for the enhancement of Zambia's socio-economic and environmental well being.
- 4.2 To support the development of regulatory capacity to assess, test, monitor and control for the safe research, development, application and commercialisation of biotechnology in accordance with agreed biosafety guidelines and regulations.
- 4.3 To ensure effective control of trans-boundary movements of genetically modified organisms (GMOs) or products thereof resulting



from modern biotechnology, through the exchange of information and risk assessment as well as a transparent system of advance informed agreement.

4.4 To ensure the safe and judicious use of biotechnology, with a view to maximising its potential benefits while avoiding to the maximum extent possible, any adverse effects on human and animal health as well as to the environment.

***4.5 Establish a set of procedures to deal with non-adherence, including swift and severe fines and other repercussions.***

## **5 GUIDING PRINCIPLES**

**5.1 The Precautionary Principle:** No approval for transfer, use and release of GMO(s) shall be given unless there is firm and sufficient evidence that the GMO(s) or products thereof pose no ***significant*** risk to human and animal health, biological diversity or the environment. ***The Precautionary Principle will only be applied when there is sufficient likelihood that serious or irreversible damage to health or the environment would occur. This implies that there would be reputable scientific evidence showing that serious or irreversible damage may occur.***

**5.2 Advance Informed Agreement:** Any person who intends to conduct research, develop, apply, release and commercialise GMO(s) and products thereof shall submit an application in writing to the National Biosafety Authority (NBA) for authorisation. **A**

***timeframe for the NBA to respond with a decision and details of an appeals process are being elaborated.*** There shall be no research, development, application, release and commercialisation of GMO(s), combinations of GMO(s) and products thereof without the prior approval by the NBA.

**5.3 Undesirable Effects of GMO(s) and Products Thereof:** The following are considered “potentially harmful effects on human and animal health as well as the environment”: disease to humans, including allergenic or toxic effects, disease to plants, animals or other organisms; adverse effects resulting from the inability to treat disease or other effective prophylaxis ***(such as the possible decrease in antibiotic efficacy due to use of antibiotic resistance genes as selectable markers)***; adverse effects resulting from establishment or dissemination in the environment; adverse effects resulting from the natural transfer of inserted genetic material to other non-target organisms.

**5.3 Risk Assessment:** No research, development, application, release and commercialisation of GMO(s), combinations of GMO(s) and products thereof shall be undertaken without a risk assessment report ***or prior evidence that the product(s) poses no hazard to human health or to the environment.*** It is the responsibility of the applicant to conduct and/or have an assessment of the impacts and risks posed by GMO(s) and products thereof to human and animal health, the environment and biological diversity, under the supervision of the NBA.

- 5.4 Socio-economic Impact:** The Risk Assessment Report shall include the direct or indirect effects to the economy, socio or cultural practices, livelihoods, indigenous knowledge systems, or indigenous technologies as a result of the import, contained use, deliberate release or placing on the market of GMO(s) or products thereof.
- 5.5 Public Participation:** The NBA shall make available to the public, information pertaining to applications for the research, development, use and commercialisation of GMO(s), combinations of GMOs and products thereof. The public may make comments within such period as may be specified by the NBA.
- 5.6 Liability and Redress:** The liability for any damage caused by the use or release of GMO(s) and products shall be borne by the user *or, unless there is clear evidence of mishandling by the user,* the importer concerned. Where the GMO(s) or products thereof cause damage to the environment, the user concerned shall take remedial measures towards restoring the environment to its original state or harm shall be fully compensated for.
- 5.7 Conservation of the Biological Diversity and Trade:** Should there be a conflict between issues pertaining to the conservation of the Biological Diversity and Trade, the conservation of the Biological Diversity shall prevail *unless, in special cases of national need, a successful appeal to the contrary is made.*
- 5.8 Rights Over Genetic Resources and Technologies:** *In all cases involving use of Zambian resources, genetic or otherwise,* the implementation of the Biotechnology and Biosafety

Policy shall be based on the fair and equitable sharing of benefits, arising out of the utilisation of genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to the technologies.

## **6 LEGAL FRAMEWORK**

- 6.1 There is no law in the existing Zambian statutes that can be used to protect human and animal health as well as the environment, including biological diversity from potential risks posed by GMOs and products thereof. The laws that are there basically deal with the transfer, handling, release and use of animals and plants. There are, however, no laws, which deal specifically with the transfer, handling and use of microorganisms. Some laws cover the quality of food and foodstuffs as well as pharmaceutical products. The other laws are concerned with protecting the general public and the environment from possible negative effects of industrial activities.
- 6.2 Where deemed necessary, therefore, existing laws shall be amended and/or modified in line with the Biotechnology and Biosafety Policy. ***Special attention will be given to cases that require highly-specific types of regulation, such as the use of contained versus uncontained microbes.***
- 6.3 A Statutory Instrument, establishing NBA and the Biosafety Advisory Committee (BAC) must be issued as soon as possible.

## **7 IMPLEMENTATION**

7.1 Establishment of the NBA and BAC will constitute the institutional framework for national decision-making and international co-operation on biosafety. The NBA shall;

7.1.1 Support the development of regulatory capacity to assess, test, monitor and control for the safe research, development, application and commercialisation of biotechnology in accordance with agreed biosafety guidelines and regulations.

7.1.2 Support the development of research and industrial capacity to safely apply biotechnology techniques for the enhancement of Zambia's socio-economic and environmental well-being.

7.1.3 Ensure effective control of trans-boundary movements of GMO(s) or products thereof resulting from modern biotechnology, through the exchange of information and risk assessment as well as a transparent system of advance informed agreement.

7.1.4 Ensure effective application of bioethical control in research related to biotechnology.

## **8 SCOPE OF THE BIOTECHNOLOGY AND BIOSAFETY POLICY**

8.1 Biotechnology and Biosafety Policy shall apply to the research, development, application, release and commercialisation of GMO(s), combinations of GMO(s) and products thereof.

- 8.2 Occupational safety **issues** at workplaces where biotechnology procedures are used or products handled;
- 8.3 Labeling **issues** of GMO(s) or products thereof, developed in/or imported into Zambia.
- 8.4 Any other measures deemed necessary to ensure protection of human and animal health as well as the environment with respect to the use of biotechnology in Zambia.

## **9 IMPLEMENTATION STRATEGY**

- 9.1 The Biotechnology and Biosafety Policy will be implemented through the NBA.
- 9.2 The Regulatory and administrative processes will include notification, information transfer and review, risk assessment, approval or refusal, risk management, including monitoring and enforcement measures pertaining to laboratory use, research and development activities, or field release procedures including handling, containment, monitoring, agreed disposal or destruction procedures and contingency plans for spillage or accidental release.
- 9.3 In order to trace GMOs and products thereof at the point of import, sectoral legislation related to import control shall require appropriate amendment and enforcement.

## **10 CURRENT INSTITUTIONAL STRUCTURES**

- 10.1 The Ministry responsible for Environment and Natural Resources is the Focal Point for the CBD while the National Institute for Scientific and Industrial Research is the National Biosafety Focal Point. The

Ministry responsible for Science and Technology is charged with the formulation and ensuring the adoption of the policy on the Biotechnology and Biosafety.

- 10.2 Other key stakeholders are the Ministries and their Statutory Boards responsible for Agriculture; Health; Commerce, Trade and Industry; Legal Affairs; Finance; Home Affairs; Information and Broadcasting; Local Government and Housing; Transport and Communications; Institutions of Higher Learning; Research Institutions; Civil Society; Industry and Traditional Administration Authorities.

## **11 PROPOSED INSTITUTIONAL STRUCTURES**

- 11.1 Upon acceptance of this policy and the enactment of the supporting legislation, the government shall establish the NBA to implement, enforce and carry out the provision of the Biosafety Regulatory Framework. In addition, the BAC and Institutional Biosafety Committees (IBC) shall be established. The BACs shall be the Technical Committee of the NBA.
- 11.2 The NBA shall advise the Government of the Republic of Zambia on all aspects concerning the research, development, application, release and commercialisation of GMO(s) and products thereof, to ensure that all operations are carried out in accordance with the provisions of the Biotechnology and Biosafety Policy.
- 11.3 The NBA shall formulate and review biosafety guidelines and regulations.
- 11.4 The NBA shall prescribe laboratory facilities capable of verifying the presence of GMO(s), combinations of GMOs and products thereof.

11.5 The BAC shall advise the NBA on prohibitions, authorisation and the exercise of necessary control of imports, authorisation or notification of contained uses, authorisation of trial or general releases; and control measures to be taken where an intentional release of GMO(s) may occur.

11.6 The IBC shall implement recommendations from the NBA.

## ***12 CAPACITY BUILDING IN BIOTECHNOLOGY AND BIOSAFETY***

12.1 Promotion of the safe use of biotechnology in Zambia will involve the strengthening of biotechnology research, development and biosafety capacities at a number of institutions in the country including:

12.1.1 National Institute for Scientific and Industrial Research (NISIR)

12.1.2 Tropical Disease Research Centre (TDRC)

12.1.3 The University of Zambia (UNZA)

12.1.4 The University Teaching Hospital (UTH)

12.1.5 Soil and Crop Research Branch (SCRB)

12.1.6 Golden Valley Agricultural Research Trust (GART)

12.1.7 The Seed Control and Certification Institute (SCCI)

12.1.8 Cotton Development Trust (CDT)

12.1.9 National Artificial Insemination Centre (Animal Genetic Resource (Centre) (NAIC)



12.1.10 Central Veterinary Research Institute (Balmoral) (CVRI)

12.1.11 National Malaria Control Centre (NMCC)

## **12.2 Human Resource Development**

12.2.1 The Government of the Republic of Zambia and the NBA shall work with regional and international training programmes to determine a cost-effective strategy for training scientists and science students in biotechnology, biosafety procedures, risk assessment and management.

12.2.2 Zambia shall rationalize its investment by making maximum use of existing regional, international and other education and training bodies in biotechnology and biosafety, and by preparing its undergraduate students for easy entry into such programmes by means of curriculum stream options.

12.2.3 Government ministries, regulatory and policy agencies shall, endeavor as a matter of urgency, to identify and implement appropriate in-house or continuing education and training on biotechnology and biosafety for their existing staff.

## **12.3 Infrastructure**

12.3.1 Rehabilitation of laboratories to suit accreditation to international standards.

12.3.2 Provision of basic equipment for biotechnology

### **13 FINANCIAL IMPLICATIONS**

- 13.1 Biotechnology and biosafety is an exceptionally expensive and specialized field of technology. If taken as an important component of a national science and technology strategy, it involves investment in infrastructure, equipment and specialist training. Equally, the regulation and monitoring of biotechnology is costly for governments, irrespective of their own biotechnology capacity.
- 13.2 Government shall provide for a creative policy and financial incentives to support institutional development.
- 13.3 Investment will become necessary to build capacity for low, medium and high-level biotechnology applications and regulation on a needs-driven basis, through training, research and partnership at regional and international level.